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Patentanmeldung Nr. Patent application No. Demande de brevet n°

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Bezeichnung der Erfindung/Title of the invention/Titre de l'invention:
(Falls die Bezeichnung der Erfindung nicht angegeben ist, siehe Beschreibung.
If no title is shown please refer to the description.
Si aucun titre n'est indiqué se référer à la description.)

Method and apparatus for carrying out diagnosis of a technical installation

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Description

Method and Apparatus for carrying out diagnosis of a technical installation

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Background of the invention

Qualitative and quantitative assessment / diagnosis of technical installations, especially of a power plants with installed turbines and generators.

10

State of the Art

Maintenance personnel walks around the plant for assessment purposes.

15

Observations are rarely stored and no long term trend analysis is applied.

Changes in personnel may lead to failures since observations are not usually compared / transferred or are not comparable / transferable.

20

Embodiments of the invention

The invention utilises human perception, similar to a polygraph (lie detector).

25

Maintenance personnel for tours may be equipped with a head-mounted (e.g. digital) camera to record the sight.

Simultaneously, neuritic currents, changes in blood pressure, pulse rate, pulse strength, galvanic skin reflex (e.g. sweat gland activity) upper and lower breathing patterns etc. may be recorded.

30

Thus the five human senses can be employed. Notes can be added manually (e.g. via PDA, hand held PC etc.).

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The results can be stored, e.g. in a database, and be used for trending and plant assessment purposes.

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The analysis of human perception and sight reveals the condition of any particular plant equipment / plant component, e.g. pumps, engines, turbines, generators and so on.

5 Example:

No unusual observations were made, e.g. by plant walkers / plant workers for months.

10 However, one day a belt drive between an electric motor and a pump is louder than usual. The reason for this may be that one of three belts is slightly loose.

After a brief check, the worker realises that there is no urgent need to tighten or change the belt. However, on subsequent tours, the workers' perception concerning the belt
15 drive will yield the condition of the belt drive, e.g. how long is the belt drive observed on subsequent tours, level of change in human perception while observing the belt drive, and so on.

20 In general, the five human senses may be efficiently utilised for plant assessment.

Human senses are very sensitive and can not yet be reproduced and/or simulated i.e. by a computer and appropriate software. However, objective assessment from human observation is usu-
25 ally hard to obtain; to overcome that problem the invention neatly combines human sensing with objective recording to a powerful plant assessment tool.

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Claims

- 5 1. Method for carrying out diagnosis of a technical installation,
characterized in that at least one human physiological re-
action of a human are acquired during an inspection tour
10 of said human around at least one part of the technical
installation.
2. Method according to claim 1,
characterized in that said human physiological reaction
15 includes neuritic currents and/or changes in neuritic cur-
rents and/or blood pressure and/or changes in blood pres-
sure and/or pulse rate and/or changes in pulse rate and/or
pulse strength and/or changes in pulse strength and/or
galvanic skin reflex and/or changes in galvanic skin re-
flex and/or breathing patterns.
- 20 3. Method according to claim 1 or 2,
characterized in that said human is equipped with a camera
device to record said human's sight.
- 25 4. Method according to any of claims 1 to 3,
characterized in that said human is equipped with at least
one sensor device to acquire said human physiological re-
action.
- 30 5. Method according to any of claims 1 to 4,
characterized in that said human physiological reaction is
stored in a database, said database representing a history
of said stored human physiological reaction.
- 35 6. Method according to any of claims 1 to 5,
characterized in that said acquired human physiological
reaction is assigned at least one failure and/or process

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disturbance of at least one component of the technical installation.

7. Apparatus for carrying out diagnosis of a technical installation, comprising at least one sensor device for acquiring at least one human physiological reaction of a human during an inspection tour of said human around at least one part of the technical installation.

8. Apparatus according to claim 7, characterized in that said human physiological reaction includes neuritic currents and/or changes in neuritic currents and/or blood pressure and/or changes in blood pressure and/or pulse rate and/or changes in pulse rate and/or pulse strength and/or changes in pulse strength and/or galvanic skin reflex and/or changes in galvanic skin reflex and/or breathing patterns.

9. Apparatus according to claim 7 or 8, further comprising a camera device to record said human's sight.

10. Apparatus according to any of claims 7 to 9, further comprising a database for storing said human physiological reaction, said database representing a history of said stored human physiological reaction.

11. Apparatus according to any of claims 7 to 10, characterized in that said acquired human physiological reaction is assigned at least one failure and/or process disturbance of at least one component of the technical installation.

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Abstract

Method and Apparatus for carrying out diagnosis of a technical installation

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The invention makes use of human perception to derive potential faults of at least one component of the technical installation. A sensor device is employed for acquiring at least one human physiological reaction.

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